

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Liang et al

Docket: TI-26415

Serial No.: 09/089,290

Art Unit: 2713

Filed: 06/01/98

Examiner: Lee



For: Reduced Resolution Video Decompression

APPELLANTS' BRIEF (in triplicate)

Assistant Commissioner
for Patents
Washington, DC 20231

MAILING CERTIFICATE	
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, DC 20231 today.	
<i>Gracia Sansom</i>	<i>12-7-99</i>
Gracia Sansom	Date

Dear Sir:

The attached sheets contain the Rule 192(c) items of appellants' brief. The Commissioner is hereby authorized to charge the fee for filing a brief in support of the appeal plus an extension of time (separate petition enclosed) and any other fees to the deposit account of Texas Instruments Incorporated, account No. 20-0668; two additional copies of this first sheet of appellants' brief are enclosed.

Respectfully submitted,

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Rule 192(c)(1) Real party of interest

Texas Instruments Incorporated owns the application.

Rule 192(c)(2) Related appeals and interferences

There are no related dispositive appeals or interferences.

Rule 192(c)(3) Status of claims

Claims 1-5 are pending in the application with all claims finally rejected. This appeal involves all finally rejected claims.

Rule 192(c)(4) Status of amendments

There is no amendment after final rejection.

Rule 192(c)(5) Summary of the invention

The invention provides a decoding of MPEG-type compressed video with a single frame having macroblocks decoded at different resolutions. Application figures 30a-30c and application pages 5-8 summarize a preferred embodiment, and application pages 15-18 detail the motion vector drift problem and how the invention overcomes the problem. This differing resolution decoding within a single frame allows for efficient conversion of high definition TV (HDTV) signals into standard definition TV by decoding I frames at full HDTV resolution, B frames at standard definition resolution, and P frames with differing resolution depending upon whether or not a macroblock is likely to lead to motion vector drift.

Rule 192(c)(6) Issues

The issues presented on appeal is:

(1) whether claims 1-5 are anticipated by or obvious over the Boyce reference.

Rule 192(c)(7) Grouping of the claims

The claims are treated as a single group.

Rule 192(c)(8) Argument

(1) Claims 1-5 were rejected as anticipated by Boyce. The Examiner cited Figs.1-4 for a joint HD/SD decoder with upsampling 131 of a stored macroblock at higher resolution, and 2x2 high frequency energy less than a threshold and 8x8 high frequency energy greater than a threshold in Fig.4.

Appellants reply that Boyce Figs.1-2B all have the preparsed input signal from buffer 116 go to syntax parser 120, inverse quantization circuit 122, reverse DCT circuit 124, and downsampler 126. Downsampler 126 determines the resolution of the decoded blocks; and all macroblocks in a frame appear to be treated to the same resolution decoding. Indeed, column 10, lines 13-23 describes the Fig.1 downsampling; column 10, lines 24-37 notes the low pass filter added in Fig.2A; and column 10, line 59 through column 11, line 9 describes Fig.2B. In each case a downsampled motion-compensated block is added by summer 128 to a (downsampled by 133) motion-compensation reference and stored in memory 118, or a downsampled uncompensated block bypasses summer 128 and is just stored in memory 118. That is, the decoded macroblocks are all downsampled and stored. Note that switch 302 adjacent downsampler 126 of Boyce Fig.2B operates to bypass downsampler 126 when the received signal is standard definition TV (which requires no resolution reduction decoding) and applies downsampling when the received signal is HDTV; see column 11, lines 10-36. Thus Boyce has no suggestion of switching within a frame to apply differing resolution decoding to differing macroblocks.

This contrasts with claim 1 which requires two different possible resolution decodings within a frame; and application Fig.30a illustrates this in the left and right branches where macroblocks may be either full and reduced resolution decoded and stored in memory.

Further, Fig.4 of Boyce applies decoders to two different TV signals simultaneously (for picture-in-picture) and, consequently, not to two different macroblocks within a single frame (of a single signal) as required by independent claim 1. Indeed, the picture-in-picture system of Fig.4 has two different TV channels decoded: one for the main picture at full resolution and the small insert picture at reduced resolution; see column 18, lines 20-24. The 2x2 resolution at column 18, line 37 is for a block from a different TV signal (and consequently a different frame) than the 8x8 block of the normal picture. Thus this has no suggestion of claim 1 or any of the dependent claims 2-5.

Consequently, claims 1-5 are patentable over Boyce.

Rule 192(c)(9) Appendix

1. A method of decoding video containing predicted frames, comprising the steps of:
 - (a) for at least one predicted frame decoding a first macroblock at a first resolution and decoding a second macroblock at a second resolution greater than said first resolution.
2. The method of claim 1, wherein:
 - (a) said macroblocks have associated motion vectors.
3. The method of claim 1, wherein:
 - (a) said video is MPEG encoded; and
 - (b) said predicted frames are P frames.
4. The method of claim 1, wherein:
 - (a) said first macroblock has high frequency component energy less than a threshold and said second macroblock has high frequency component energy greater than said threshold.
5. The method of claim 2, wherein:
 - (a) said decoding of said second macroblock includes upsampling of a stored reference macroblock.